Abstract Submitted
for the SHOCK05 Meeting of
The American Physical Society

Transverse Shock Wave Depolarization of the $Pb(Zr_{52}Ti_{48})O_3$ Polycrystalline Piezoelectric Energy-Carrying Element Of A Compact Pulsed Power Generator JASON BAIRD, SERGEY SHKURATOV, Loki Incorporated, LARRY ALTGILBERS, US Army SMDC, ALLEN STULTS, US Army RDEC, EVGUENI TALANTSEV, Confederation School, LINC, HENRY TEMKIN, Dept of Elect Engr, Texas Tech U., YAROSLAV TKACH, Gomez Inc. — The results are presented on experimental investigations of the depolarization of a poled lead zirconate titanate $Pb(Zr_{52}Ti_{48})O_3$ polycrystalline energy-carrying piezoelectric ceramic element within a compact ferroelectric generator (FEG) by an explosive shock wave traveling across the polarization vector $\boldsymbol{P}_0$. We show that shock wave compression of the energy-carrying ferroelectric element causes a phase transition in the ferroelectric material that results in almost complete depolarization of the sample. The electric charge stored in the ferroelectrics, due to their remnant polarization, is released within a short time interval and can be transformed into pulsed power. Detailed experimental results are presented for shock wave depolarization of $Pb(Zr_{52}Ti_{48})O_3$ energy-carrying elements of different shapes and sizes.

Jason Baird
Loki Incorporated

Date submitted: 22 Apr 2005 Electronic form version 1.4